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EDITORIAL

CLINICAL RECORDS

It has always been the policy of The Veterinary Journal to foster and encourage all branches of veterinary science. There are few callings which offer such a great field of endeavour, or in which the young graduate has such a wide choice from which he may plan his future career. This great variety of opportunity has been the most potent factor in the continued existence of the profession, for as one door has inclined to close many others have opened; indeed, some have been installed by the initiative of the members of the profession. As a result our work has increased in its interests and also in the service that we can render to the public. Such a profession naturally calls for great variety in the contents of its periodicals, and this is all to its good. One gets away from the one track mind of the extreme specialist "who knows a lot about a little yet nothing about a lot." Any profession which draws its life blood from the healing art must of necessity pay great attention to what is called the clinical side of affairs, the part which epitomises the work of the ordinary man in the profession. The whole fabric of the science is built up on this foundation, and the majority of practitioners are always searching for the ways and means to enhance their competence. One way of doing this is by hearing of the experiences of their fellows, and in turn passing on such knowledge as they themselves may have gained.

We therefore welcome articles from clinicians, for they and their works are the salt of a virile profession.

XUM

General Articles

EXPERIENCES IN THE CONTROL OF CONTAGIOUS ABORTION OF CATTLE IN THE UNITED STATES

By A. B. CRAWFORD,

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THE control of brucellosis of cattle, or contagious abortion as the disease is termed in the British Isles, was a problem of over fifty years' standing in the United States, this despite the fact that the Bureau of Animal Industry of the United States Department of Agriculture and experiment stations in many of the various States were carrying on intensive investigations of this disease during a greater portion of this period.

In the early years of investigation, most of the salient features of the disease were learned. Bernard Bang, of Denmark, had discovered its cause to be a micro-organism that was termed by a sequence of names until the current term, *Brucella abortus*, was adopted. It was learned that brucellosis is essentially a disease of the pregnant, susceptible cow; that the germ, *Br. abortus*, localises in the pregnant uterus, placental tissues and fœtus, and is liberated in the uterine excretions following parturition or abortion, thus contaminating the surroundings and providing exposure to cohabiting animals; that the causal germ may localise in the udder and remain there for an indefinite period; that an infected cow may overcome infection following abortion or a subsequent normal parturition, or may remain infected for life; that the disease may be diagnosed by appropriate laboratory tests; that the disease in most instances is introduced into a free herd by the purchase of an infected animal; and many other facts of common knowledge to-day. In fact, for many years practically everything about brucellosis of cattle was known except how to cure it or control it. A cure still remains for the future to disclose, a most fertile and worthy field for research and one that holds the direction flag of many failures.

Control Measures

Various methods of control were tried during these years.

Sanitary Control.—This system is practised without professional supervision and to best advantage in herds in which no additions from outside are made. Animals are watched closely for signs of impending abortion or normal parturition, and, when such evidence occurs, they are placed in a maternity stall until abortion or parturition has occurred and uterine discharges have ceased. If abortion should occur in the barn or field, the fœtus, as well as the placenta, is removed as quickly as possible. The spots where the fœtus or placenta were dropped are thoroughly disinfected or covered with loose straw, which is burned. The aborting cow is confined until uterine discharge ceases. As exposure almost in its entirety is offered at the time of abortion or premature or apparently normal parturition in infected cows, and for a short period thereafter, this practice reduces the exposure of non-infected animals in the herd to a minimum that can often be successsfully resisted. Thus the disease may remain in a

quiescent stage, or it may eventually disappear through the recovery or disposal of affected animals. This practice of sanitary control is of great benefit in any method of control, as it removes to a large extent the means by which the disease is perpetuated.

Test-and-segregation.—This method of control consists of keeping the reactors to the serum-agglutination test apart from the negative animals, with the ultimate hope of establishing a clean herd. Separate premises and utensils are necessary for each group. Retests at frequent intervals are made of the negative group in order that incipient infection may be detected and the reacting animal transferred to the infected group. Many valuable herds were freed from infection by this method, but for obvious reasons this practice was discarded when less laborious, less expensive, and more effective methods were evolved.

Test-and-slaughter.—In 1931 and 1932 the production of livestock in the United States was in excess of purchasing power. This naturally resulted in lowering the price of food animals, especially cattle, to such a degree that the raising of livestock become unprofitable. Lack of sufficient feed, due to a severe drought, also affected the raising of cattle. To remedy this situation, the Government in 1933 instituted a cattle reduction programme, in which excess cattle were purchased by the Government and slaughtered, and the meat was used in relief during that period of world-wide depression.

In 1934 this programme was amended to obtain a reduction by removing animals affected with various diseases, one of which was brucellosis, or contagious abortion. This was termed " The Federal-State Co-operative Programme for the Control of Bang's Disease," and all but a few of the 48 States participated. At that time there was an estimated 10 per cent. incidence of infection in cattle.

Under the direction of the Federal Bureau of Animal Industry, plans were set up in the various participating States for testing cattle in infected herds. Federal and State veterinarians and accredited practising veterinarians were assigned to draw blood samples, which were sent to central State testing laboratories. The laboratories made the agglutination tests, kept necessary records, and reported the results to the veterinarians. The veterinarians then appraised the reacting animals. The reactors were sent to slaughter. The owners were paid nominal sums for the condemned cattle, and the costs were borne by the Federal and State Governments, minus the salvage price paid by the abattoir. Retests were made at periodic intervals. At the beginning of the programme the submission of a herd was elective on the part of the owner, but later the " area plan " of eradication was also adopted, in which a county was an area unit. For a county to become " modified-accredited," the incidence of infection had to be reduced to not more than 1 per cent. of the total cattle population, with the further qualification that not more than 5 per cent. of herds should show infection. There are 3,070 counties in the 48 States, and on April 1, 1944, 591 counties in 22 States were on the modified-accredited list.

In December, 1940, the use of strain 19 *Brucella abortus* vaccine, prepared from a strain of reduced virulence, was permitted by the Federal Government for the vaccination of calves in infected herds in the official programme, subject to approval by State livestock authorities. A further departure was made in permitting the optional retention of reacting adult cattle in the herd until

XUM

vaccinated replacements became available. The employment of these two modifications were also elective on the part of the individual States. This led to the adoption of three control plans by most of the States:

(A) "Test-and-slaughter" with payment of indemnity;
(B) The "A" plan plus calfhood vaccination;
(C) "Test-and-hold" plus calfhood vaccination, with no indemnity for the reacting animals retained.

In the test-and-hold plan, the reacting animals are kept in the herd. Annual or more frequent tests of the whole herd are made. The reacting animals are eliminated when vaccinated replacements become available.

In the ten years the test-and-slaughter method has been practised it is estimated that the incidence of brucellosis throughout the United States has been reduced by one-half.

With the entry of the United States into the war, and the resulting necessity for increased production of livestock and dairy products, not only for local needs but also for lend-lease purposes, the primary reason for slaughter of brucellosis-reacting cattle was eliminated. The operation of the plan is being increasingly affected also by the loss of personnel through their entry into the armed services or private practice, and other reasons. The framework of the Federal-State Control programme is still intact, however, and it is hoped in the post-war period that, with evolving modifications, this programme can be pursued to an extent that will decrease the incidence of the disease comparable to that obtained in bovine tuberculosis.

Vaccination.—The fact that an aborting cow on subsequent pregnancies tends to carry her calf full-term, and that a cow recovered from brucellosis is resistant to the disease thereafter, furnished definite evidence in early investigations of a logical basis for vaccination in the control of this disease. In sequence, and often with considerable overlapping, killed vaccines, vaccines prepared from avirulent strains of *Brucella abortus*, fully virulent strains, attenuated strains, extracts from the organism, and even vaccines prepared from *Brucella suis*, were used experimentally and in field practice with varied results in different hands.

An increased resistance was obtained with killed vaccines but it was not sufficient to warrant their use under natural exposure. In the light of our present knowledge on dissociation of Brucella from the S, or smooth, through the various I, or intermediate forms, to the R, or rough forms, and that the R or avirulent colonial types of Brucella form immune substances only for R forms of Brucella, it is now evident why avirulent vaccines were of no practical value. The use of virulent cultures was copied from the English practice advocated by Stockman. While in most vaccinated non-pregnant animals a solid immunity resulted, in many instances it established the disease and localised in the udder. The production of vaccine from virulent cultures was prohibited by the U.S. Department of Agriculture in 1932, and commercial biological establishments were licensed to produce vaccine only from *Brucella abortus* of reduced virulence. None of the other vaccinal preparations was found effective for the desired purpose.

The more conservative of livestock authorities had become opposed to vac-

XUM

cination in any form and thus a fertile field was created for the inception of test-and-slaughter in 1934. Some objections developed to the slaughter programme as it progressed, and the use of strain 19 vaccine, at first cautiously but with ever-increasing volume, came into popular favour in many States.

Strain 19 Brucella Abortus Vaccination

In 1925, Dr. John M. Buck, of the Bureau of Animal Industry, recovered a strain of *Brucella abortus* of reduced virulence which was carried culturally as "strain 19." This strain was used with other strains of Brucella in vaccination experiments. It appeared to be stable in its virulence and produced a remarkable degree of immunity without becoming established in the mammary glands or genital tract of cattle vaccinated with it. Fortunately, this strain was carried on a medium that maintained its smooth characteristics, and apparently its virulence has not varied since its discovery, as attested by the results of guinea-pig inoculations made periodically since its discovery.

From 1928 to 1933, five calfhood vaccination experiments were conducted by Cotton and Buck with strain 19 vaccine. A total of 70 calves were vaccinated at four to eight months of age. They were exposed to virulent infection during their first pregnancy, with an equal number of control animals. A summary of these experiments shows that, of the 70 vaccinated animals, one aborted, two produced weak calves, four aborted from causes other than brucellosis and 63 produced normal calves. Of 73 controls, 51 aborted, four produced weak calves and 18 produced normal calves.

This experimental evidence was so favourable that the Bureau of Animal Industry in 1935 began a five-year field trial of calfhood vaccination in 260 heavily infected herds. All calves between four and eight months of age were vaccinated. The infected animals were allowed to remain in the herds to provide exposure. Of 8,182 pregnancies in cows vaccinated as calves during the first 4½ years of these trials, 96.2 per cent. were normal and 3.8 per cent. resulted in abortion. Of the latter, 58.7 per cent. were in cows negative to the blood test, which reduced the percentage of abortions due to Bang's disease to 1.6 per cent.

These results were so strikingly in favour of calfhood vaccination that the Chief of the Bureau, in December, 1940, approved, for the Government, the use of calfhood vaccination as an adjunct to test-and-slaughter. The field trials were carried two years further and the compiled data showed a total incidence of abortion due to brucellosis of approximately 1.1 per cent. in the cows vaccinated as calves.

Stability and Safety of Strain 19 Vaccine

In the tests with guinea-pigs, which have been made several times each year since the discovery of strain 19, there has been no apparent change in its virulence. That this organism will dissociate if not maintained under proper conditions has been shown in the examination of vaccines produced by certain commercial licensees. To safeguard the commercial product in this respect, seed cultures are supplied each concern every two months.

That the virulence of strain 19 cannot be increased under conditions which should favour this change was shown in an experiment by Mingle and Manthei

XUM

at the Bureau's Animal Disease Station. In a small enclosure, a normal pregnant cow was injected intravenously with a dose of strain 19 *Brucella abortus* containing about 20 times the number of organisms used in a vaccinal dose. This intravenous injection resulted in abortion. Brucella was recovered in pure culture from the fœtal material. A second, normal, pregnant cow was similarly injected with the recovered culture. This cow aborted and Brucella was recovered. This procedure was followed serially in seven animals. Following each abortion a group of guinea-pigs was injected with the recovered culture and another group with the original stock culture. Also at the time of each abortion, at least one normal pregnant cow was placed in this field as an exposure control. In each instance the aborted fœtus and placenta were left where they fell until badly decomposed, to provide further exposure to the control cows.

In none of the groups of guinea-pigs inoculated with recovered cultures of strain 19 was evidence obtained of an increased virulence as a result of this serial passage through cattle. The lesions in the "recovered" groups were quite comparable with those in the "stock" groups.

A total of nine normal pregnant cattle were added to the environment during the course of the experiment. None of these contracted brucellosis. All calved normally and from none could Brucella be recovered from the uterine discharge, placenta, or colostrum at time of parturition. Several of these control animals developed a transient blood titer.

All 16 of these cattle were again bred in this enclosure and all had normal parturitions. A most noteworthy fact is that in none of the seven principals was Brucella recovered from the uterine tract, placenta, or colostrum following this second pregnancy, indicating that strain 19 infection had been spontaneously eliminated.

This test was conclusive in showing the stability and safety of strain 19 *Brucella abortus*.

A large amount of evidence is available of the vaccination of calves in negative herds, and adult animals also, without establishing the disease in such herds.

Vaccination of Adult Cattle

All evidence that has accrued from the vaccination of adult cattle indicates that the increased resistance resulting therefrom is equal, at least, to that produced in calves. Many practitioners use "whole herd" vaccination as their sole method in controlling abortion and are satisfied with the results. The chief objection to this practice, from a control standpoint, is that it causes an agglutinin response in older animals that tends to persist. Obviously, this persistent titer interferes with the operation of the Federal-State programme, which is based on the blood test, and for that reason the Bureau of Animal Industry has not sanctioned its use except in selected cases.

From experimental evidence, adult vaccination in the United States appears to have its chief application in early infection in pure-bred herds where valuable blood lines are involved. Where abortions have been occurring for a year or more this practice has not stopped abortions immediately, although it has undoubtedly prevented the spread of infection to many of the non-infected animals, especially the recently bred and non-bred heifers.

XUM

There would also appear to be logic in the practice of adult vaccination in an outbreak of the disease in beef cattle. In the United States beef cattle are in large part maintained under range conditions, where it is most difficult to blood test. Also, under range conditions, where stock of different owners mix on the range, the blood test and slaughter programme cannot operate successfully. Furthermore, since there are no serious human implications in reacting cattle of this type the persisting titers are not a cause of much concern.

Local health department ordinances or regulations requiring blood negative cows for milk production is a contra-indication for adult vaccination.

Vaccination of Pregnant Cows

When Farmers' Bulletin No. 1871, Brucellosis of Cattle, was being written in 1940, the statement was included that pregnant animals should not be vaccinated, as abortion had resulted in several instances following its experimental use in such animals. The data upon which this statement was made were very meagre. Recently acquired data indicate that when such abortions do occur they are usually in animals vaccinated in advanced pregnancy, that is, from the fifth month on; that they are more apt to occur in negative herds than in infected herds; and that the incidence of such abortions varies in individual herds.

On the whole it is believed that the number of pregnant cows in an infected herd that abort as a result of vaccination is no more, and probably less, than would contract the disease and abort were they not vaccinated, and that a vaccinal abortion is much less undesirable than an abortion resulting from natural exposure. From the experimental evidence of Mingle and Manthei, previously cited, it would appear that strain 19 *Brucella abortus* disappears from the genital tract and udder before the succeeding pregnancy, whereas the cow aborting from virulent Brucella is a potential spreader for an indefinite period.

Calfhood Vaccination in Comparison with Adult Vaccination

This question is controversial. The Federal Government and State control officials necessarily must choose calfhood vaccination because the persistent titer resulting in adult cattle excludes the herd from participation in the Federal-State programme.

In herds not in the official programme and for which there is no immediate prospect of entering or intent to enter, the choice is more dependent on herd conditions. The average herd owner is interested primarily in securing a normal calf crop. The persistence of blood titer is secondary in interest. Then again the hard and cold fact remains that if heifers unbred, or early in first pregnancy, are not vaccinated, a large percentage of them will contract the disease if exposure exists. Further, calfhood vaccination usually requires several years to reach its full benefits in any particular herd. The inclination toward "whole herd" vaccination among practitioners appears to be increasing, especially as a result of present world conditions.

The question may thus be answered from the standpoint of expediency. The owner of an infected herd naturally desires immediate results, which in some herds are probably best served by adult vaccination. In other herds, calfhood

XUM

vaccination and the possible extension of vaccination to include unbred heifers, may control the disease and result in a more orderly procedure. The type of herd and degree and length of infection are involving factors to be considered. The regulatory official, on the other hand, looks at the matter from the standpoint of final results, which in most instances are best served by calfhood vaccination only.

Persistence of Immunity in Vaccinated Cattle

The average length of time that immunity resulting from vaccination with strain 19 will persist has not been definitely established.

In the field trials, previously mentioned, in 260 heavily infected herds, the incidence of abortion in vaccinated animals became appreciably lower each year until the trials were stopped in their seventh year. In these herds the infected cattle were not removed except for poor production or other natural causes. The tendency for the lowering of the incidence of abortion in succeeding years may be explained by a decrease in the exposure animals through recovery from the disease or separation from the herd, and the fact that the resistance in the vaccinated animals was undoubtedly augmented by constant contact with the infected animals.

Reports have been received recently of breaks in vaccinated herds that have been on a negative status for from six to nine years, herds in which test-and-slaughter was initially practised and in which the progeny were since vaccinated. The breaks occurred in the older animals only. These results clearly indicate that vaccinal immunity diminishes, as would naturally be expected. The fact that in the field trials, where infected exposure animals were present, the immunity was not apparently decreased in six years, in comparison with the breaks in old vaccinated but negative herds, would indicate the necessity of revaccination at some definite period subsequent to the initial vaccination.

Experiments are in progress at the Bureau's Animal Disease Station, in which groups of cattle vaccinated as calves and since maintained free from exposure will be exposed to virulent *Br. abortus* during their third, fourth and fifth pregnancies, with an equal number of controls kept under similar conditions. The artificial exposures will be made in these groups within a year. The results will provide definite knowledge of the persistence of vaccinal immunity in the absence of intervening exposure.

Intradermic Method of Vaccination

In 1942 research was initiated at the Maryland State Livestock Sanitary Service Laboratory on the intradermic method of vaccination of cattle against brucellosis. A dose of 0.1 or 0.2 cubic centimetres of strain 19 vaccine prepared for subcutaneous use was injected intradermally. The purpose of this departure from the usual method was to determine whether or not the intradermic method would result in the more rapid disappearance of the vaccinal agglutinin response.

The basic principle underlying intradermic vaccination seemed to justify this work, by analogy with results in other diseases, notably equine encephalomyelitis. In connection with the latter disease, it was shown that 1 c.c. equine

XUM

encephalomyelitis vaccine introduced intradermally produced as effective immunity as 10 c.c. subcutaneously.

Preliminary results in the Maryland investigation indicate that in calves vaccinated intradermally the vaccinal titer disappears a little sooner than by the subcutaneous method, but in adult cattle there is no appreciable difference. A comparative study of the opsono-cytophagic index was made in calves and adult cattle vaccinated by both methods and the results so far obtained show no difference in the degree and persistence of the opsonic response in the respective groups. It has not been proved that the opsono-cytophagic index is a true measure of immunity, nor has sufficient time elapsed to test the resistance of bovines vaccinated by the intradermic method. However, the idea has had considerable appeal, and similar investigations are now in progress at the Bureau's Animal Disease Station and several State experiment stations.

An interesting fact was brought out in this work in connection with the vaccination of lactating cows. In such animals vaccinated subcutaneously it has been reported by several workers that there is a marked decrease in milk flow for seven to ten days, which accompanies the systemic reaction to the injection, whereas in cattle vaccinated intradermally there is no systemic reaction or decrease in milk production.

If the intradermic method of vaccination should prove to be as effective as the subcutaneous, this would result in lowering the cost of vaccination, as 25 cattle could be vaccinated with one subcutaneous dose.

Production of Strain 19 Brucella Abortus Vaccine

As strain 19 *Brucella abortus* is a product of the Bureau of Animal Industry, the Bureau has established a protective control over it. A separate, specially-designed laboratory, in which no other organism is handled, was constructed at the Bureau's Animal Disease Station. In it is prepared the vaccine furnished to the various States for the vaccination of calves in infected herds under the Federal-State programme. Representative samples of each batch of vaccine produced by twenty-one Federally-licensed commercial biological concerns are also tested for purity, viability, pH, and density before the commercial products can be sold. All possible precautions are taken to preserve this strain in its constancy. Sealed lyophilised cultures (quickly frozen and dehydrated under high vacuum) are stored for safety purposes.

Production of Brucella Antigen

In the early days of the test-and-slaughter programme, each State testing laboratory produced its Brucella antigen. There was such a lack of uniformity in these respective antigens that the Bureau of Animal Industry undertook the preparation of all antigen used in the official programme. This antigen is prepared at the Bureau's Animal Disease Station. Both plate and tube antigens are prepared, and are distributed to the various State laboratories, as requested.

State Regulations for the Control of Brucellosis of Cattle

In the control of bovine brucellosis, the policy of the Department of Agriculture has been to approve the use of various procedures and to leave to

XUM

the discretion of the State livestock officials the method or methods deemed most suitable to the cattle industry in the respective States. The matter of control has thus been controversial, and this has been reflected in the control regulations in the various States. In some States, regulatory officials still favour slaughter, with a depressant action on vaccination, in spite of popular opinion. In others a more open stand in favour of vaccination predominates; for instance, in the States of New York and Vermont the programme consists of calfhood vaccination, with yearly blood tests of the entire herd and retention of reactors until vaccinated replacements become available. In a few States the matter of control is left more or less in the lap of the herd owner. This lack of uniformity in State laws and regulations has resulted in some disturbance in the inter-State shipment of cattle, particularly of vaccinated young stock still holding some reaction to the blood test. Efforts are being made to minimise these discrepancies. With the ever-increasing sentiment in favour of vaccination as a basic principle rather than as an adjunct to test-and-slaughter, progress along this line appears probable in the near future.

Discussion and Summary

It will be noted from the foregoing remarks that, after many years of test and trial of various methods of control, two excellent methods, test-and-slaughter and vaccination with strain 19 *Brucella abortus*, came into prominent use almost simultaneously.

Test-and-slaughter had the more immediate appeal, because it was introduced at a time when there was a large surplus of cattle, and its adoption had a dual purpose—cattle reduction and elimination of a most serious cattle disease. The advocates of test-and-slaughter argued that vaccination was still in the experimental state and that its use should be postponed until strain 19 could be proved to be safe, stable, and efficacious.

That the test-and-slaughter method was effective as a control measure is borne out by the fact that the incidence of bovine brucellosis has been decreased by one-half since its adoption. Its effectiveness has been greatly augmented by the area plan of eradication. In fact, the area plan in bovine brucellosis control has proved to be almost as advantageous as it was in tuberculosis eradication, by reducing the possibility of reinfection in cleaned herds.

There has been some criticism, however, of the test-and-slaughter plan. It did not lend itself too well to many types of herds, such as range beef herds and large pure-bred herds. Another annoying factor was the so-called "problem herd," a herd in which reactors are found on repeated tests, making the accreditation of the herd a long-drawn-out process; while such herds represented only a small portion of the herds under control, the repeated testing necessary to accredit them prevented to some extent the extension of control services to herds on the waiting list. Another fact that has since become apparent is that the accreditation of a once-infected herd is no assurance that it will stay free from brucellosis.

During this period, many private practitioners, as well as individual herd owners, were using commercial strain 19 vaccine in combating abortion. The uniformly favourable reports from these sources and from the Bureau's field

XUM

trials in 260 infected herds, together with research indicating the safety and stability of strain 19, led in 1940 to the official adoption of calfhood vaccination as an adjunct to test-and-slaughter.

With the outbreak of war, the necessity for increased food production, including meat, milk, and cheese, favoured the retention of producing cows in a herd even though reacting to the blood test for brucellosis. This condition naturally led to the greatly increased use of vaccine.

With our entrance into the war, an ever-increasing labour shortage has resulted in slowing up the Federal-State programme. The framework is still intact and operations are continuing, although on a much reduced scale.

The aim of the Bureau of Animal Industry is to eradicate brucellosis of cattle in the United States. Irrespective of the method or methods followed by individual States in the control of this disease, the slaughter of infected animals must be the final procedure. It is apparent, therefore, that, during the war period, vaccination, preferably in calves but supplemented in some herds with adult vaccination, must be the method of choice in those sections in which the "area plan" is not operating and in which the incidence of the disease is relatively high. Vaccination is being practised extensively, which should result in a more highly-resistant cattle population and, *per se*, in the reduction of the incidence of the disease.

It is believed, therefore, that during the war period the cattle industry in the United States is being safeguarded against abortion disease by the practice of vaccination, and that in the post-war period the official programme can be resumed in full volume without loss of any gains so far obtained.

POST-MORTEM LESIONS NOTED IN PIGS USED IN COTTONSEED FEEDING TRIALS

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An article published in the *East African Agricultural Journal*, Vol. VIII, No. 2, of October, 1942, by M. H. French, M.A., Ph.D., of the Veterinary Research Laboratory, Mpwapwa, Tanganyika Territory, describes certain experiments on the feeding of cottonseed to fattening pigs. Unfortunately the details of the post-mortem findings had to be omitted from the article on account of paper restrictions. It is thought that, although not spectacular, these findings may be of interest to veterinarians, and therefore a summary of that part of the paper dealing with the pathology of the experimental animals is sent for publication.

The post-mortem examinations in the first two trials were made by H. E. Hornby (late Director of Veterinary Services) and A. H. Milne, Veterinary Officer, and those in the third trial by J. K. H. Wilde, Veterinary Research Officer.

XUM

Some Post-mortem Findings in Experimental Cottonseed Feeding in Pigs, Summarised from a Paper by M. H. French, M.A., Ph.D.

In the past, opinions on the toxicity of cottonseed when fed to pigs have varied considerably, and experimental results have proved somewhat confusing. The value of this foodstuff for stock other than pigs has been amply demonstrated at Mpwapwa, where it forms a standard constituent of the concentrate rations of cattle, sheep, goats and donkeys.

French writes, in the Annual Report of the Department of Veterinary Science and Animal Husbandry, Tanganyika Territory, 1937, page 95, as follows :—

" Cottonseed is not normally regarded as a pig food, but the value of this product for all classes of stock has been under investigation for a number of years and it seemed advisable to publish these figures. Cottonseed has been fed to pigs by this Department in various experiments, and in one case to a mature female for a period of six months without any other type of food, with no symptoms of poisoning. It seems, therefore, that in certain instances cottonseed could form a valuable supplement for brood sows, but only small quantities should be tried because of the many reported instances of gossypol poisoning in swine following the feeding of cottonseed meal or cake."

All writers on animal nutrition stress the toxic nature of cottonseed or its cake when fed to pigs. Among them are Henry and Morrison (1936), Withers and Carruth (1915), Rommel and Vedder (1915), Binns (1938), Schwartze and Alsberg (1924).

French therefore carried out a series of experiments on this subject, because, as he says in his account of the work (*E.A. Agricultural Journal*, October, 1942) : " In view of the constantly repeated statements that cottonseed is poisonous to pigs, the fact that a pig has been fed for six months without any serious troubles arising and the very important part that cottonseed could play in pig dietaries in this territory if it were not toxic, it was decided to try the effects of cottonseed in the rations of fattening pigs. For this study three separate groups of pigs from mixed litters were used."

As the relationship between various methods of feeding cottonseed to pigs and the pathological changes taking place in these pigs (presumably due to the method of feeding) may be of interest to veterinarians, I have been asked to give an account of the post-mortem findings in the pigs used in the above three trials.

Trial 1. Six Pigs (Fattening Stock)

No. 30.—This pig's rations contained 10 per cent. cottonseed throughout the experiment, i.e., from 70 lb. to 130 lb. liveweight. It died after a short illness, eight weeks after the beginning of cottonseed feeding. The symptoms included a thermal reaction and respiratory difficulty.

Post-mortem findings: Pneumonic patches in lungs. Enteritis.

No. 31.—From 72 lb. to 110 lb. liveweight, the ration contained 10 per cent. cottonseed. From 110 lb. to 132 lb. liveweight, 18 per cent. cottonseed. This pig died six weeks after the cottonseed feeding commenced and suffered a short illness, similar to that of No. 30. Similar lesions were also shown at post-mortem examination.

XUM

No. 33.—From 70 lb. to 107 lb. liveweight the ration contained 10 per cent. cottonseed. This pig died six weeks after the commencement of cottonseed feeding, showing the same symptoms and lesions as the former two.

No. 32.—From 74 lb. to 102 lb. liveweight the rations contained 10 per cent. cottonseed. Death occurred four weeks after cottonseed feeding commenced, preceded by a short illness similar to those suffered by pigs 30, 31 and 33.

Pneumonic patches in the lungs and enteritis were again noted.

No. 34.—From 70 lb. to 105 lb. liveweight the rations contained 10 per cent. cottonseed; from 105 lb. to 140 lb. liveweight, 18 per cent. cottonseed; and from 140 lb. to 160 lb. liveweight, 25 per cent. cottonseed. Thereafter the cottonseed proportion was reduced to 18 per cent., as liveweight ceased to increase. A short illness was suffered 11 weeks after the commencement of the experiment and the pig was killed.

Post-mortem lesions: Pneumonic patches in the lungs, gastritis and enteritis.

No. 35.—The cottonseed feeding of this pig was increased from 0-20 per cent. in four weeks (60 lb. to 80 lb. liveweight). It was allowed to remain at 20 per cent. for five weeks (80 lb. to 107 lb.) and then reduced slowly to 9 per cent. (110 lb. to 150 lb.). The pig was thus receiving cottonseed in its rations for fourteen weeks.

No untoward symptoms were noted. The animal was slaughtered and no unusual post-mortem lesions were evident. (The post-mortem examination was not entirely satisfactory, owing to the absence of the veterinarian concerned.)

Trial 2. Four Pigs (Fatteners)

No. 39.—This pig was fed on a ration containing 10 per cent. cottonseed from 90 lb. to 150 lb. liveweight and 15 per cent. from 150 lb. to 200 lb. liveweight.

It never showed any illness, but on slaughter black patches were found in the mucous membrane of the intestines; there was some gastritis and there were pneumonic patches in the lungs.

No. 37.—The ration contained 10 per cent. cottonseed from 90 lb. to 150 lb. liveweight and 15 per cent. from 150 lb. to 200 lb. This pig showed no untoward symptoms, but after slaughter the post-mortem picture was as follows:—

Pneumonic patches in the lungs. Black patches in the intestinal mucosa. A small area of gastric mucous membrane inflamed.

Patchy catarrhal inflammation of the intestinal mucosa.

No. 40.—The ration contained 10 per cent. cottonseed from 70 lb. to 120 lb. and 15 per cent. from 120 lb. to 200 lb. The animal showed no symptoms of illness, but when slaughtered the following lesions were found:—

Pneumonic lesions in the lungs. Inflammation of a portion of the gastric mucosa. Catarrhal inflammation of the mucosa of the intestines with some hæmorrhagic patches and some black patches.

No. 41.—The ration contained 10 per cent. cottonseed from 90 lb. to 150 lb. and 15 per cent. cottonseed from 150 lb. to 200 lb. No sickness was noted, but at slaughter the same lesions were noted as in No. 40.

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Trial 3. Six Pigs

Nos. 55 and 56.—These pigs received no cottonseed in their rations. They were slaughtered, in healthy condition.

No. 55 showed no abnormalities on post-mortem examination, but No. 56 showed a slight injection of a small area of the gastric mucous membrane. Sections through this area, on microscopical examination, showed indications of a mild inflammation.

Nos. 54 and 57.—These pigs received 10 per cent. cottonseed in their rations from 100 lb. to 190 lb. liveweight. No untoward symptoms were shown, but at post-mortem examination the following picture was seen:—

No. 54: Streaks of inflammation in the mucous membrane of the fundus of the stomach.

Intestines slimy and showing patches of inflammation.

Microscopical examination of sections showed no abnormalities worthy of note.

No. 57: Extensive inflamed area in the fundus of the stomach and patchy areas of pneumonic appearance in the lungs.

Microscopical examination of sections revealed pneumonia with extravasation of blood into the alveoli and the stomach showed some heavy hæmorrhagic injection and areas of epithelial degeneration.

No. 58.—This pig's rations contained 10 per cent. cottonseed from 98 lb. to 118 lb. and 20 per cent. from 118 lb. to 183 lb. liveweight. The animal was slaughtered in apparent good health and showed:—

Slight red patches of consolidation in the lungs (about a quarter of the lung area involved).

A hard and greenish liver.

Very slight erythema in the mucous membrane of the fundus of the stomach.

Microscopically the liver showed the commencement of interstitial hepatitis.

No. 59.—In this case the rations contained 10 per cent. cottonseed from 104 lb. to 125 lb. and 20 per cent. cottonseed from 125 lb. to 184 lb. liveweight.

The pig was slaughtered in apparent good health and showed:—

Hyperæmia of the mucous membrane of the cardiac border of the fundus of the stomach.

In the jejunal region, about four yards of intestine showed reticulated enteritis. Slight inflammation at the flexure of the colon. Diffuse pneumonia with a dark purple patch in the dorsal region, the remainder of the lungs being diffusely petechiated.

Microscopic examination of sections showed congestion and degeneration of jejunal epithelial layers. The gastric mucosa was highly congested. Broncho-pneumonia and early stage consolidation were apparent in the lungs.

Remarks

The pathological changes which were found in pigs which were fed a certain proportion of cottonseed in their rations were not very marked or extensive, but it is reasonable to assume that those which were found were at least in some degree the result of the cottonseed feeding.

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This pathological effect seems to be confined to fatteners, as earlier trials on adult pigs produced no ill-effects.

There appears to be a decrease in the degree of pathological effect from the first to the third trial, and it must be noted that different lots of cottonseed were used in each trial, and it is well known that cottonseed toxicity varies considerably.

The conclusion drawn by French on the feeding value of cottonseed for fattening pigs is of interest and is quoted below:—

"Cottonseed cannot be recommended as a food for fattening pigs because it reduces the appetite, slows down the rate of fattening and increases the amount of food required to form 1 lb. of liveweight increase. In larger amounts it will cause a more pronounced set-back in the rate of fattening and may even prove fatal."

My thanks are due to the Director of Veterinary Services, Tanganyika Territory, for permission to publish this report.

REFERENCES

Withers, W. A., and Carruth, F. E. (1915): *Journal of Agric. Res., 5,* 261.
Binns, H. R. (1938): *Journ. of Comp. Pathol., 51,* 296-304.

FRACTURE OF THE AXIS IN A GREYHOUND

By MAJOR R. F. WALL, M.R.C.V.S.,
Windsor.

THE subject, a 21-months-old greyhound, fell at the second fence during a trial for a hurdle race. The first impact was upon the posterior part of the occiput, apparently to the left of the median line, after which he fell upon his back, regained his feet facing the direction from which he had come, and, partly dazed and shrieking with pain, he attempted to continue the chase.

I found there was some dislocation and distortion of the neck and was fortunate in reducing it at once, with the result that the acute pain was relieved and the patient ceased to scream, which afforded an opportunity to make a closer examination. Pressure from the upper part of the neck was tolerated, but when applied to the lower part in the region of the larynx, or if the head was raised, evidently caused a very great degree of pain. I came to the conclusion that there was a fracture of the left condyle of the axis and perhaps involving the lower part of the atlas.

I advised the trainer to get into touch with the owner as soon as possible, state the case and ask permission to have an X-ray of the neck and a consultation with Dr. McCunn, because it was a pity to throw away a chance of complete recovery by delay, and lose a promising young dog. I have reason to believe that the trainer deemed it to be a case of "sprain" and that he would be all right in a few days. In the meantime I had a broad bandage of thick felt wrung out of hot water and bandaged to the neck so that movement was restricted. The accident occurred on April 4, and it was not until the 7th that I could contact the owner. On the morning of April 8, I took the dog to the Royal

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Veterinary College to be X-rayed by Mr. Knight and obtain the opinion of Dr. McCunn. A few minutes after commencing the journey the patient rose from his recumbent position at the back of the car and rested his head upon my right shoulder just before the car passed over a deep hole in the road. The jolt caused him to scream with pain, so I pulled up, examined him, and did my best to ease it. To my surprise, the head had returned to almost normal position, and it can only be assumed that the sudden jolt completed the reduction of the dislocation; he travelled in comfort with his head upon my shoulder from Windsor to Camden Town.

Dr. McCunn and the X-rays confirmed the diagnosis. Dr. McCunn very kindly put the neck in plaster of paris and the patient rested comfortably until after I returned him to his kennel. For the next few days he was not disturbed, except to raise him to his feet by means of his kennel coat, and the only time he manifested pain was when he raised his head. That all passed after about six days, except on occasions when he became boisterous. The plaster cast was removed after 16 days and the neck gently massaged twice daily. Recovery was complete and the dog ran a good trial on May 21.

One often hears of, but seldom sees, animals showing gratitude for one's efforts to relieve their suffering, but there was no doubt of it in this case. Despite the acute pain I caused him in order to reduce the distortion, or when getting him to his feet to perform his natural functions or to feed, he never attempted to bite me, always manifested pleasure on my arrival, and I am convinced that, as it was painful for him to get upon his feet, he never attempted it until I went to his assistance during the early stages.

A PROBABLE CASE OF MALIGNANT CATARRH IN A SHORTHORN COW

By J. B. TUTT,
Winchester

Subject.—Red Shorthorn cow. Calved several months.

History.—The cow was pastured with the herd and was noticed to be down in her afternoon milking. On the following day there was complete cessation of milk yield, inappetence, bellowing, licking of the nose and lips and shaking of the head. The nose was noticed to be inflamed. On the third day the nose was discoloured black, and what little milk was present was stringy in nature. The case was seen on the fourth day.

Symptoms.—Temperature 100.2. The nose was black and parchment-like, and upper and lower lips were necrosed. There were areas of necrosis on the dorsal central surfaces of the tip of the tongue. The perineum was swollen and brownish black in colour. There was slight ocular discharge, with granular conjunctivitis. The animal was active, but not feeding.

Diagnosis.—Croup. Malignant catarrhal fever.

Course.—Local antiseptic treatment was applied. On the fifth day a fetid dark diarrhœa developed and the teats became brownish-black and parchment-like.

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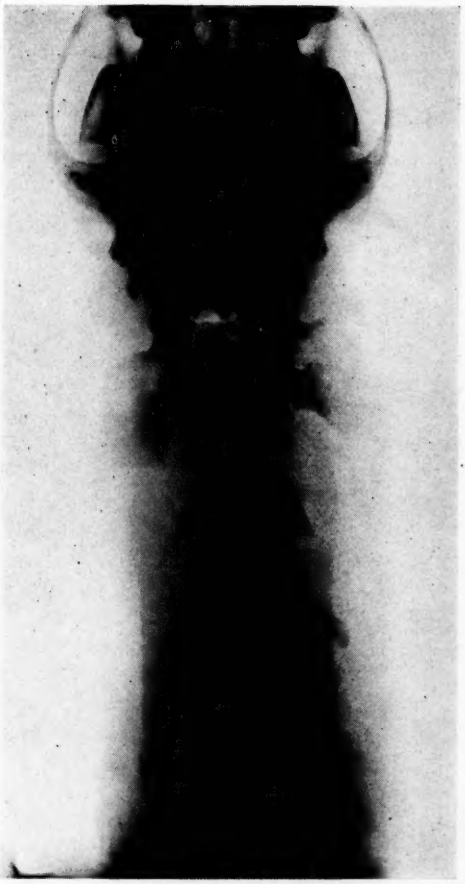
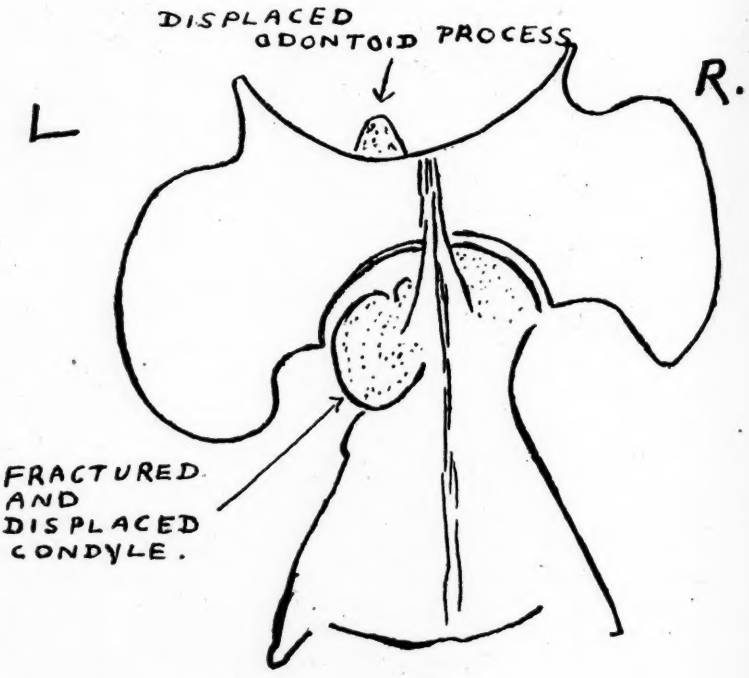


[*Article by Major R. F. Wall*



KEY. DIAGRAM.

Article by Major R. F. Wall]

On the sixth day the diarrhœa had ceased; the teats had started to peel without leaving any sore areas. Milk yield was up to a gallon and normal in appearance. The perineal region had become normal without peeling. By the ninth day the nose had started to peel, leaving sore areas. There was a nasal discharge, but the animal was feeling well and the milk yield was up to 1½ gallons. The teats had peeled without leaving sore areas. By the thirteenth day the animal was normal, except for a few areas on the nose, and her yield was up to three gallons.

Conclusion.—This condition has been described by Pierse in the *Veterinary Record** recently; it is also described under the name "Croup" in Hutyra and Marek. The above case is the only one I have ever seen in Hampshire and the condition does not appear to be very infectious or contagious, as this animal was the only one affected. Unlike the text-book description, malignant catarrhal, the case did not show severe symptoms and had a favourable conclusion.

* *Veterinary Record,* Vol. 55, No. 43, p. 387.

ERYSIPELAS IN AN ELEVEN-DAY-OLD PIG

By C. WEIGHTON, M.R.C.V.S.,
Lincoln

A LARGE white sow bought at a sale on October 12 farrowed 16 piglets on October 18. On October 28 the sow refused to eat and the owner could feel hard swellings under the skin but was unable to detect skin discoloration. Treatment—50 c.c. erysipelas serum. When I examined the sow the following day she refused to rise and showed distinct erysipelas patches over the whole body. Her temperature was 104.0 degrees F. Only nine of the piglets were alive. (The others had not died from disease as far as could be ascertained.) All appeared healthy except one, which had lost the tip of its tail. The affected piglet would not suck, shivered, revealed a temperature of 107.2 degrees F., and showed unmistakable erysipelas lesions, one at the base of the ear and two on the hind quarters. Two other piglets had temperatures of 101.5 degrees F. respectively. Treatment—sow, 50 c.c. serum; affected piglet, 5 c.c. serum.

October 30—temperature of sow, 107.0 degrees F.; treatment, 35 c.c. serum. The affected sucking pig's temperature had dropped to 103.0 degrees F. No serum was given. Two days later the spots had nearly disappeared, the youngster was sucking normally and rapidly made a satisfactory recovery. The sow was unable to rise for several days, but eventually made a good recovery.

This is the first case I have seen in a sucking pig. The following notes from standard works are of interest.

Anthony: "Swine erysipelas seldom attacks very young pigs, old sows and boars."

Buchanan: "Very young animals—under three months—and those over one year rarely contract the disease."

Hutyra and Marek: "Hogs are particularly susceptible to natural infection between the ages of three months and one year. Sucking pigs manifest a higher resistance."

XUM

Abstracts of Current Literature

DICOUMARIN AND SALICYLATES*

In 1941, Heubner and Link, of the Wisconsin Agricultural Experiment Station, discovered that dicoumarin is the active principle of spoiled sweet clover which is responsible for the hæmorrhagic disease of cattle known as sweet clover poisoning. They also demonstrated that this principle is readily degraded to salicylic acid. The occasional nosebleed following large doses or long-repeated doses of aspirin in the human is attributed to the same low prothrombin level as that of cattle suffering from the toxic action of sweet clover hay. Both the human and bovine toxicosis, the one due to aspirin and the other to dicoumarin, are obviously due to an insufficient intake of vitamin K, and the low level of prothrombin as a consequence thereof.

* *Journal of the American Medical Association,* March 18, 1944.

TYROTHRICIN IN THE TREATMENT OF BOVINE MASTITIS†

The discovery of tyrothricin by Dubos, of the Rockefeller Institute of Medical Research, in 1939, has shown that this extractive of *Bacillus brevis* is remarkably germicidal against the gram-positive bacteria associated with chronic bovine mastitis, and is of such low toxicity that it can be employed safely for infusing the galactophorous sinus of infected udders. Clinical studies carried out under scientifically controlled conditions by Bryan, Weldy and Greenberg, of Michigan State College, have confirmed previous reports to the effect that a single infusion will practically sterilise a large percentage of infected udders. Sometimes as many as 99 per cent. were cured by a single treatment, and rarely fewer than 30 per cent. Out of 157 infected cows, 142, or 90 per cent., were cured by a single treatment. The effectiveness of the treatment was not lowered by the duration of the infection, providing no marked indurations were present in the udder. The results were checked by standard plate bacteria counts.

† *Veterinary Medicine,* September, 1942.

MILK-SERUM AGGLUTINATION TEST‡

The milk-serum agglutination test is the latest method added to the various tests for detecting the presence of Brucella organisms in cows' milk. Since pasteurisation destroys *Brucella abortus,* the test applies only to raw milk. The test, however, is recommended by the Committee on Standard Methods for the Examination of Dairy Products and thus is given official status. The mounting occurrence in man of undulant fever (brucellosis) in recent years gives additional importance to it. A survey made in Vermont revealed that half of the cases of undulant fever occurred along the routes of licensed raw milk dealers. The application of the test on the milk of 690 herds showed that the milk of 12 of the herds was infective. On the whole, in this survey the animals detected as infected by the blood-serum test and the milk-serum test tallied for all practical

‡ *Milk Technology,* January-February, 1944.

XUM

purposes. While milk can be made safer either by removing reactors to the blood-serum test or by pasteurisation, the milk-serum test is of great value in furnishing information to officials engaged in combating the disease.

TRANSMISSION OF BRUCELLOSIS BY BULLS*

EXPERIMENTS carried out at the experimental farm of the State Serum Laboratory of Denmark exempted infected bulls as transmitters of *Brucella abortus* to susceptible heifers. The object of the experiment was to determine also whether bulls may be passive carriers after serving infected heifers having the causal organism in their vaginal secretions. Four bulls which were excreting the organism in their semen served 27 sexually mature heifers. Eight failed to conceive, 19 calved normally, and none aborted. Heifers were then served by bulls immediately after serving cows excreting *Brucella abortus* in their vaginal discharges. Of 20 heifers thus bred, 14 calved normally and none aborted. The conclusion was that copulative transmission may be disregarded.

* *Journal of Comparative Pathology and Therapeutics* (London), April, 1943.

RELATIONSHIP OF TEAT PATENCY TO UDDER INFECTION†

MASTITIS of dairy cows in the face of the attempt to produce an unprecedented quantity of milk is a subject of tremendous importance since the disease is widespread and greatly reduces the amount of milk produced. The incidence of the disease ranges around 25 to 35 per cent. in the principal dairy cattle states, and besides diminishing *per capita* production, many cows have to be replaced annually as a consequence. Inasmuch as it has been generally conceded that patency of the teats is a prime cause of the most prevalent type, that is, the type due to *Streptococcus agalactiæ*, the incidence of that anatomical defect among 142 cows was studied in its relationship to the presence of the infection. A total of 549 udder quarters were examined for relative patency of their teats. Forty-nine of the cows had mastitis. In a series of 205 quarters, 71 had patent teats and 134 non-patent. Of the patent group, 50.7 per cent. were found to be suffering from either streptococcic or staphylococcic mastitis, while in the non-patent group the incidence was 32.1 per cent.

† *Cornell Veterinarian*, January, 1944.

GONADOTROPIC HORMONE IN ROOSTERS‡

GONADOTROPIC hormone (pregnant mare's serum) was used successfully to step up the fertility and sexual vigour of sexually immature White Plymouth Rock, Barred Plymouth Rock and White Leghorn roosters. The results were comparable to those obtained in mammals. The behaviour of the roosters was rapidly transformed from timidity to aggressiveness, and feather growth of the hackle, back and saddle was greatly accelerated. The testes quickly enlarged beyond the normal level of males of the same size and age. Examinations of the testes of treated birds showed active spermatogenesis in all areas. The cost of the treatment may limit its application on a large scale.

‡ *Poultry Science*, March, 1944.

RENEWED INTEREST IN ACRIDINE DYES*

SINCE the advent of the sulphonamide drugs, new studies of the microbicide action of proflavine and acriflavine have shown that the therapeutic value and reliability of these dyes has been underestimated, especially in staphylococcal infections and in wounds already suppurating. In this class of infection, proflavine is being described as revolutionary in speed and efficiency and somewhat superior to acriflavine, although both have a degree of effectiveness no less remarkable than the sulpha drugs, all conditions being equal. It is now regarded as a mistake to have discarded these one-time widely used antiseptics in the treatment of pyogenic infections of animals. The production of proflavine sulphate with a solubility of 1 in 250 in water as compared with the former 1 in 300 rate required by the U.S. Pharmacopœia is a factor that has improved its therapeutic value.

* *Journal of the American Veterinary Medical Association*, May, 1944.

FACTORS INVOLVED IN THE SYNTHESIS OF VITAMINS IN THE RUMINANT†

By B. W. FAIRBANKS, Ph.D., and J. L. KRIDER, Ph.D.,
Department of Animal Husbandry, University of Illinois

THE creation of vitamins within the body of ruminants makes it almost impossible to set up standards of requirements for such species. The feeding value of rumen contents of slaughtered animals has been investigated, and workers at Wisconsin (A. Booth and E. B. Hart) have found it to be comparable in "vitamin B potency" with whole-milk powder, whey, yeast and alfalfa meal. It is known that ruminants can synthesise thiamin, riboflavin, nicotinic acid, pantothenic acid, pyridoxine, biotin and vitamin K, and Hart has shown that the amount of B factors in the milk corresponds to the rate of synthesis in the rumen. As this synthesis is associated with the development of the rumen and its host of bacterial and infusorial contents it follows that for the first few weeks of its life the calf must depend greatly on its diet for its vitamin supply, especially the B factor. Even after the rumen flora is established there may be a delicate balance between the body needs and the synthetic powers within the rumen.

This may be the explanation why attempts to rear calves on synthetic diets have not always been successful in the past. On a natural diet such difficulties are not encountered.

The bacteria of the rumen digest course food and deposit nutrients on their bodies. The bacteria are in turn digested by protozoa in the rumen. These are passed on into the true stomach and intestines and transformed into food nutrients. Therefore the type and number of bacteria in the rumen may be very important in determining the quantity and numbers of the factors synthesised in the rumen and to be used by the host.

It would appear that vitamin C is destroyed in the rumen. Vitamin C is constant in the blood plasma, irrespective of the amount in the diet. The authors favour the theory that vitamin C is synthesised in the tissues of the body, but the site has not been conclusively shown.

† *N.A.V.*, Vol 25, Nos. 1 and 2, pages 22-25, 97-100.

XUM

Feeding experiments have shown that diet may alter the action of bacteria. The activity of those responsible for B factors depends somewhat upon an active fermenting medium. Fermentable carbohydrates are essential for riboflavin synthesis. Riboflavin synthesis is related to the amount of corn fed, and the rate was highest when the grain was ground.

Other examples are quoted.

The physical balance of the ration may be also a considerable factor, for it is related more or less directly to the saliva flow, and the saliva flow may alter appreciably the pH of the rumen. The pH of the rumen depends largely upon:

(1) The chemical composition of the food.

(2) The amount of organic acids produced by bacteria.

(3) The neutralisation effect of the saliva.

A favourable reaction for the rumen contents is a pH of from 6.7 to 7.3.

Sulphur is contained in a number of proteins and vitamins synthesised within the rumen, and in purified diets sulphur may be a valuable supplement for the ruminant. Within the temperature ranges which normally occur in the rumen, temperature has little effect on the rate of fermentation.

The experimental evidence designed to show if the nitrogen level is a factor is as yet inconclusive.

In their summary, the authors state "that there are probably many other factors which have not been discussed, or which are not known at the present." With this we are in entire agreement, and with the authors "we'll watch developments in this field with keen interest."

Thirty-seven references are quoted.

PROGRESS REPORT ON PLANS FOR THE CONTROL OF BANG'S DISEASE*

By C. D. GILVRAY and J. S. GLOVER

In 1938 three schemes for the control of Bang's disease were inaugurated:—

Plan A. Routine testing of individual herds.

Plan B. Supervised testing of herds in prescribed areas.

Plan C. Supervised calfhood vaccination.

Plan A. Practising veterinary surgeons submit the blood samples to the College Laboratory. Provision is also made for the testing of cattle for export to the U.S.A. Number of tests:

		Negative	*Positive*	*Doubtful*
Routine,	141,887 ...	81%	14%	5%
Export,	18,179 ...	94%	4%	2%

Plan B. Is available where a group of ten or more owners occupying contiguous premises in a prescribed area submit a petition to have their herds tested under the supervision of a registered veterinarian. Veterinarians are paid for taking and submitting the blood samples. Materials for collection, charts and the agglutination tests are provided free of charge. All cattle over twelve months of age are required to be tested at intervals from 60 to 90 days.

* *Report of the Ontario Veterinary College*, 1942, pages 16-18.

XUM

Reactors are earmarked and segregated or sent for slaughter and the premises cleaned and disinfected. When a herd passes three negative tests within a year the owner is expected to take the necessary steps to have the herd check tested for listing under the regulations of the Health of Animals Branch.

Ten prescribed areas have been established and tables are quoted, of which the following is a summary:

Number tested	26,767
Negative	24,885 = 93%
Positive	883 = 3%
Doubtful	999 = 4%

Plan C. Calf vaccination has been practised in 1,475 herds under College supervision. 17,500 calves have been vaccinated with a live vaccine prepared from Cotton's No. 19 strain Brucella Abortus. The vaccine is supplied only to registered veterinarians for the treatment of calves between four and eight months of age. Records and identification forms are kept. Calves are check tested 30 days following vaccination to see if the vaccine has produced positive results. Slightly over 95 per cent. show a positive reaction to the 30-day check test, less than 5 per cent. being negative or doubtful. The latter are revaccinated.

It would appear that the vaccination is of some value in building up some resistance against natural infection during the first pregnancy, and to a lesser extent during subsequent pregnancies. This may indicate that to provide further resistance against infection heifers should be revaccinated after their first period of gestation.

HYPERTROPHY OF THE PROSTATE GLAND*

By JOHN D. GADA, V.M.D.,
Townsin, Maryland

THE author describes an operation for the relief of enlargement of the prostate in the dog. The operation is one in which the gland capsule is incised to relieve pressure. The approach is via the abdomen via an anterior pubic incision. Sulphathiazole powder is sprinkled over the raw surface. It is not necessary to remove any of the gland other than enough to ensure that the edges of the incision will not meet too easily. He claims that the gland subsequently decreased in size in four cases to half the original size in less than two months. Sexual function and masculine characteristics are retained.

Relief in urination and defecation is immediate after operation.

* *J.A.V.M.A.*, Vol. CIV. 802, pages 15-17.

News

ESTABLISHMENT OF REGISTRY OF VETERINARY PATHOLOGY AT THE ARMY INSTITUTE OF PATHOLOGY, ARMY MEDICAL MUSEUM, WASHINGTON, D.C.

RECENTLY an arrangement was approved by the Surgeon General of the U.S. Army and the Board of Governors of the American Veterinary Medical Association for the establishment and maintenance at the Army Institute of

Pathology, Army Medical Museum, Washington, D.C., of a Registry of Veterinary Pathology. This registry will become a unit of the American Registry of Pathology, an organisation operating by the authority of the Surgeon General under the sponsorship of the National Research Council.

The purpose of the American Registry of Pathology is comprehensive investigation in certain special fields, which at present comprise: ophthalmic pathology, otolaryngitic pathology, orthopædic pathology, dental and oral pathology, neuropathology, dermatologic pathology, pathology of neoplasms, with special consideration to those of the endocrine glands, the kidney, the urinary bladder, and the lungs. Through close co-operation with various national societies, records and material in these several specialties are brought together at the Army Institute of Pathology for systematic study. The number of specimens received is considerable; for example, there are now available for investigation 4,747 tumours of the urinary bladder and nearly 2,000 malignant melanomas of human eyes. There are also on hand prepared sections of eyes from many different species of animals. All the material and the records of the Registry are available for study to graduate students, specialists, as well as other authorised persons.

For Registry of Veterinary Pathology it is desired to assemble (a) material representing general pathologic anatomy, including vitamin deficiencies, specific diseases of different tissues and organs, and examples of natural and experimentally induced neoplasia; (b) a complete collection of prepared slides representing the normal histology of the different species of animals, including domesticated and wild mammals, birds and cold-blooded vertebrates; and (c) material illustrating experimentally induced lesions of infectious diseases.

As material accumulates, loan sets of slides will be made available for study. Similarly, sets of lantern slides will be prepared which pertain to topics of special importance; these also will be available for loan to contributors.

This announcement is for the information of veterinarians and others interested in comparative pathology; it is hoped that they will make full use of the Registry and send to it material deemed of interest for teaching and for the investigation of animal and human diseases. Material submitted should be addressed to: The Director, Army Institute of Pathology, Army Medical Museum (attention: Registry of Veterinary Pathology), 7th and Independence Avenue, S.W., Washington 25, D.C. The director will be glad to furnish further instructions to contributors for submission of material to the Registry of Veterinary Pathology.

SPECIAL COMMITTEE ON REGISTRY OF VETERINARY PATHOLOGY

W. H. Feldman, Mayo Foundation, Chairman.

Captain Charles L. Davis, V.C., Army Institute of Pathology.

Harry W. Schoening, Chief, Pathological Division, U.S. Bureau of Animal Industry.

Member ex officio

Lt. Col. Balduin Lucké, M.C., Deputy Director, Army Institute of Pathology.

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THE FARMERS' CLUB (1842-1944)

MEETINGS in 1944-45. Mr. W. J. Cumber, C.B.E., chairman:—

Monday, November 6.—Subject: "The Policy of Expansion of our Dairy Farming"; reader: Mr. J. L. Davies.

Monday, December 4.—"Pigs in the Long Range Policy"; Mr. H. R. Davidson.

Monday, January 8.—"British Agriculture and World Conditions"; the Earl de la Warr.

The meetings will be held at the Royal Empire Society, Craven Street, London, W.C.2, at 2.30 p.m.

With reference to the above notice, we have received the following letter from the Secretary of the Farmers' Club:—

Dear Professor McCunn,

I shall be delighted to extend invitations to veterinary surgeons, and I am sure it will be most useful to the Club to do so.

I have pleasure to enclose a notice of forthcoming meetings and shall be happy to send invitation cards to any of your readers or friends who would care to be present.

Yours very truly,

F. T. LEVICK,
Secretary.

The Farmers' Club,
3, Whitehall Court, London, S.W.1.
October 10, 1944.

MR. ARNOLD LEESE, M.R.C.V.S., has published two supplements to his well-known book, "A Treatise on the One-humped Camel." The object of these supplements is to keep the book up to date. These supplements may be obtained from the author at 20, Pewley Hill, Guildford. Members of the profession may obtain the supplements by enclosing a penny stamp to cover cost of postage. To others the cost is 6d., post free.

Publishers' Notices

Copy of advertisements should be in the hands of the publishers—Baillière, Tindall and Cox—not later than the 1st of the month, if proof is required.

Letters for the Journal, literary contributions, reports, notices, books for review, exchanges, new instruments or materials, and all matter for publication (except advertisements) should be addressed to the Editor.

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